forming an isolation ground path along a surface of the circuit board and coupling the wall with at least a portion of the isolation ground path for grounding the wall and the lid structure.

45. (AMENDED) The method of claim 42 further comprising coupling the signal distribution layers to components of the subcircuits and coupling the ground plane layer to the chassis body ground surface.

REMARKS

Claims 1-46 were originally pending in the application. Claims 17-23 have been canceled. The remaining claims are still pending.

Section 112 Rejections

Claims 1, 3-9, 10-21, 23-27, 35-38, and 40-46 are rejected under 35 U.S.C. § 112 as being indefinite and failing to recite a structure in the body of the claims to support the power amplifier recitation in the preamble. The various pending claims have been amended to recite a gain subcircuit within the plurality of subcircuits, thus tying the preamble to the claims, and making the claims both consistent and definite with respect to a power amplifier.

Claim 9 was rejected under § 112 as reciting a controlled impedance circuit, which the Examiner has indicated was not in the specification. However, as discussed on page 17, specifically lines 10-20, the first conductive layer 16 contains controlled impedance circuits with the ground plane of

conductive layer 80 completing the controlled impedance circuits. Therefore, claim 9 is definite and is discussed in the specification. Therefore, Applicant requests withdrawal of the § 112 rejections.

Section 103 Rejections

Claims 1, 3-8, 10-21, 23-27, 35-38 and 40-46 are rejected under 35 U.S.C. § 103(a) over the reference of Pressler et al. (U.S. Patent No. 5,550,713). Of the pending claims in that rejected set of claims, independent claims 1, 24, 35, and 41 have been amended to recite the power amplifier comprising a circuit board having a plurality of subcircuits, wherein the circuit board comprises multiple conductive layers, including multiple signal distribution layers, and a ground plane layer disposed between the multiple signal distribution layers. The claims further recite a signal distribution layer embedded in the circuit board. Such an embedded signal distribution layer is not exposed on a top or bottom surface of the board, but is interposed between such top and bottom surfaces.

The Pressler et al. reference does not in any way teach or suggest such a limitation or the overall power amplifier now recited in the claims. That is, the Pressler et al. reference does not teach multiple distribution layers, separated by a ground plane layer, for distributing signals throughout the layers and between the subcircuits of the power amplifier. Nor does Pressler et al. teach a signal distribution layer embedded in the circuit board. Rather, the Pressler et al. reference only discusses utilization of one or more ground plates

disposed in the intermediate insulating layer 55. The various ground traces 56, 58, 60 and 62 are then connected to the ground plates through a plurality of conductive vias 66. There is no teaching of multiple conductive signal distribution layers separated by a ground plane layer wherein at least one of the signal distribution layers is embedded in the circuit board. Such a configuration allows for signals to be conducted in one of the signal distribution layers with the ground plane layer providing the ground for that layer, such as for utilizing controlled impedance circuits between the layers. The signal distribution layer embedded in the circuit board then allows additional signals to be transferred through the circuit board independently of the signals of the first signal distribution layer and isolated from that layer. Furthermore, the embedded layer is not exposed to the outside surfaces of the circuit board or to interferences surrounding the circuit board. Furthermore, the interference is minimalized between the various signal distribution layers by the ground plane, which is disposed between those signal distribution layers.

The only teaching in Pressler et al. regarding signal distribution is the utilization of an exposed top surface 52 or an exposed bottom surface 54, which are both exposed on either side of the circuit board. As such, the Pressler et al. reference does not anticipate or render obvious the invention recited in the claims.

The Examiner argues in the Office Action that the reference teaches that the circuit board might have various conductive layers, and that

various of those layers might be configured for signal distribution as disclosed and claimed in the invention. However, such a conclusion is completely unsupported by the reference of Pressler et al., and that reference cannot render obvious the claims based upon such an unsupported conclusion. Pressler et al. teaches that any conductive traces are on the outside exposed surfaces of the circuit board, not embedded therein. The Examiner argues that providing more layers would simply be expedient in the art. However, each of the specific layers of the amplifier design have a specific purpose, and the teaching of Pressler et al. cannot simply be expanded by arguing that any number of layers might be added and they might be configured in any specific way to achieve the invention. Such a conclusion is clearly unsupported and would provide no teaching to a person of ordinary skill in the art to somehow modify the teaching of the Pressler et al. reference to yield the present invention, which includes multiple signal distribution layers, with one of the signal distribution layers being embedded in the circuit board and separated from the other signal distribution layer by a ground plane layer.

Accordingly, the independent claims 1, 24, 35, and 41 are not rendered obvious over the reference of Pressler et al. The claims depending from these independent claims also recite unique combinations of elements not rendered obvious by the Pressler et al. reference.

Nor does the reference of Achiriloaie Patent No. 6,094,354 provide any additional teaching that would render the pending claims obvious, when

combined with Pressler et al. Specifically, the Achiriloaie reference is relied upon by the Examiner for teaching power amplification circuitry on a circuit board. The configuration taught in the Achiriloaie reference is similar to that of Pressler et al. in that the printed circuit board 40 comprises exposed top and bottom surfaces wherein conductive traces and conductive ground planes are formed. There is no discussion or teaching to a person of ordinary skill in the art of embedded signal distribution layers, but rather only an inner insulated core material 42 is taught. Accordingly, the combination of Pressler et al. and Achiriloaie does not render obvious the claims discussed above, nor does the combination render obvious claims 2, 9, 22, 28-34, and 39, which were rejected over that combination. As such, the claims define an invention allowable over the cited art of reference, as those references fail to render obvious the claimed invention based upon their teachings, either alone or combined.

Applicant submits that the pending claims are currently in an allowable form and requests an indication of their allowability at the Examiner's earliest convenience.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment.

CONCLUSION

Applicant authorizes the fee for a two-month extension of time, as well as any other fees deemed necessary herein, to be charged to Deposit Account 23-3000.

If any issues remain in the case, which may be handled in an expedited fashion, such as through a telephone interview, the Examiner is certainly encouraged to contact the undersigned.

Respectfully submitted,

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VERSION SHOWING MARKED-UP CHANGES

IN THE CLAIMS:

Claims 17-23 have been canceled. Claims 1, 2, 6-9, 24-25, 28, 33, 35, 41, and 45 have been amended as follows:

1. (AMENDED) A power amplifier comprising:

a single circuit board having a plurality of subcircuits, including a gain subcircuit, thereon;

the circuit board comprising multiple conductive layers including a first signal distribution layer, a second ground plane layer and a third signal distribution layer embedded in the circuit board, the second ground plane layer disposed between the first and third signal distribution layers;

a chassis body and a lid structure for coupling with the chassis body to contain the circuit board;

at least one wall extending from the lid structure and surrounding a subcircuit to electrically isolate the subcircuit from other subcircuits on the circuit board.

2. (AMENDED) The power amplifier of claim 1 wherein the gain subcircuit [one of said subcircuits] is a high power gain subcircuit, the at least one wall surrounding the high power gain subcircuit.

3. The power amplifier of claim 1 wherein said wall forms a cavity for containing said subcircuit.

4. The power amplifier of claim 1 wherein the circuit board includes a ground path formed along a surface of the board, the wall coupling with a portion of the ground path for grounding the wall and the lid structure.

5. The power amplifier of claim 4 wherein said ground path is shaped to surround a portion of the subcircuit, the wall having a shape generally corresponding to the shape of the ground path.

6. (AMENDED)The power amplifier of claim 1 wherein [said circuit board has] the multiple conductive layers are separated by [a] dielectric layers, the [a] first conductive layer being coupled to components of the subcircuits and [a] the second conductive layer defining a ground plane.

7. (AMENDED)The power amplifier of claim [6] 1 [further comprising a] wherein the third signal distribution [conductive] layer is separated from the second ground plane [conductive] layer by a dielectric layer and is configured for distributing signals across the circuit board and between subcircuit components.

8. (AMENDED)The power amplifier of claim [6] 1 further comprising a fourth conductive layer separated from the third [conductive] signal distribution layer by a dielectric layer and [having] defining a ground plane.

9. (AMENDED) The power amplifier of claim [6] 1 wherein said first [conductive] signal distribution layer includes at least one controlled impedance circuit, the second [conductive layer] ground plane layer completing the controlled impedance circuit.

10. The power amplifier of claim 8 wherein said fourth conductive layer is electrically coupled to the chassis body.

11. The power amplifier of claim 8 wherein said fourth conductive layer is substantially metallized.

12. The power amplifier of claim 1 wherein said lid structure includes component clearance areas adapted to provide clearance for components of the subcircuits.

13. The power amplifier of claim 1 wherein said chassis body includes a least one coupling channel formed therein to allow coupling connections between subcircuits.

14. The power amplifier of claim 1 wherein the wall includes a pathway formed therein for connecting subcircuits together.

15. The power amplifier of claim 1 further comprising a gasket coupled to said wall for further isolating the subcircuit.

16. The power amplifier of claim 1 wherein the chassis body includes at least one channel adapted to contain at least one subcircuit extending downwardly from the circuit board.

17.(CANCELED) A power amplifier comprising:

a single circuit board having a plurality of subcircuits thereon;

a chassis body with a conductive ground surface;

a lid structure for coupling with the chassis body to contain the circuit board, the lid structure including walls extending therefrom to electrically isolate the subcircuits from each other;

a ground isolation path formed in the circuit board and surrounding at least a portion of one of the subcircuits, a lid structure wall being electrically coupled to the ground isolation path for isolating the subcircuit.

18. (CANCELED) The power amplifier of claim 17 wherein the ground isolation path is electrically coupled with the chassis body ground surface.

19. (CANCELED) The power amplifier of claim 17 wherein the lid structure wall coupled to the ground isolation path has a shape generally corresponding to the ground isolation path.

20. (CANCELED)The power amplifier of claim 17 further comprising a gasket coupled to the wall and positioned between the wall and the ground isolation path.

21. (CANCELED)The power amplifier of claim 17 wherein said circuit board has multiple conductive layers separated by a dielectric layer, a first conductive layer being coupled to components of the subcircuits and another conductive layer defining a ground plane, the another conductive layer being electrically coupled to the chassis body ground surface.

22. (CANCELED) The power amplifier of claim 21 wherein said first conductive layer includes at least one controlled impedance circuit, the another conductive layer ground plane completing the controlled impedance circuit.

23. (CANCELED) The power amplifier of claim 17 wherein the ground isolation path includes a plurality of plated vias extending into the circuit board.

24. (AMENDED) A power amplifier comprising:

a multiple-layer circuit board having a plurality of subcircuits, including a gain subcircuit, thereon [and defining a ground plane in one of the layers];

the circuit board comprising multiple conductive layers including a first signal distribution layer , a second ground plane layer and a third signal distribution layer embedded in the circuit board, the second ground plane layer disposed between the first and third signal distribution layers;

a chassis body and a lid structure for coupling with the chassis body to contain the circuit board, the circuit board ground plane layer being coupled to the chassis body;

a plurality of plated vias extending through the circuit board to electrically carry signal and ground between the layers [couple to the ground plane layer], some of the plurality of vias forming a ground isolation path positioned between at least two subcircuits;

at least one wall extending from the lid structure and coupled to the ground isolation path to electrically isolate the subcircuit from other subcircuits on the circuit board.

25. (AMENDED) The power amplifier of claim 24 wherein [said circuit board has] the multiple conductive layers are separated by [a] dielectric layers, [a] the first conductive layer being coupled to components of the subcircuits and [another] the second conductive layer defining a ground plane.

26. The power amplifier of claim 24 further comprising a gasket coupled between said at least one wall and the ground isolation path for further isolating the subcircuit.

27. The power amplifier of claim 17 wherein the lid structure wall coupled to the ground isolation path has a shape generally corresponding to the ground isolation path.

28. (AMENDED) A power amplifier comprising:

a single circuit board having a power supply subcircuit and a high power gain subcircuit thereon;

the circuit board comprising multiple signal distribution layers with at least one signal distribution layer embedded in the circuit board and a ground plane layer disposed between the signal distribution layers;

a chassis body and a lid structure for coupling with the chassis body to contain the circuit board;

at least one wall extending from the lid structure and disposed between the power supply and high power gain subcircuits to electrically isolate those subcircuits.

29. The power amplifier of claim 28 wherein the circuit board includes an isolation ground path formed along a surface of the board, the wall coupling with a portion of the isolation ground path.

30. The power amplifier of claim 28 wherein said isolation ground path is shaped to surround a portion of one of the subcircuits, the wall having a shape generally corresponding to the shape of the isolation ground path.

31. The power amplifier of claim 28 wherein the ground isolation path is electrically coupled with the chassis body.

32. The power amplifier of claim 28 wherein the ground isolation path includes a plurality of plated vias extending into the circuit board.

33. (AMENDED) The power amplifier of claim 28 wherein [said circuit board has] the multiple [conductive] layers are separated by [a] dielectric layers, [a first conductive] the signal distribution layers being coupled to components of the subcircuits and [another conductive] the ground plane layer defining a ground plane[, the plated vias coupling to the ground plane].

34. The power amplifier of claim 28 wherein said power supply subcircuit and a high power gain subcircuit are positioned generally at opposite ends of the circuit board.

35. (AMENDED) A method of isolating subcircuits of a power amplifier comprising:

positioning a plurality of subcircuits, including a gain subcircuit, on a single circuit board;

distributing signals in the subcircuits through multiple conductive signal distribution layers wherein at least one of the signal distribution layers is embedded in the circuit board;

providing a ground plane layer between the multiple conductive signal distribution layers;

mounting the circuit board in a chassis body;

positioning a lid structure having walls extending therefrom over the circuit board such that the walls surround at least one subcircuit and electrically isolate it from another subcircuit.

36. The method of claim 35 further comprising forming an isolation ground path along a surface of the circuit board and coupling the walls with at least a portion of the isolation ground path for grounding the wall and the lid structure.

37. The method of claim 35 further comprising shaping the isolation ground path to generally follow the shape of the walls surrounding the at least one subcircuit.

38. The method of claim 35 further comprising coupling a gasket to walls surrounding the subcircuit for further isolating the subcircuit.

39. The method of claim 35 further comprising positioning a power supply subcircuit and a high power gain subcircuit on the circuit board and positioning them generally at opposite ends of the circuit board.

40. The method of claim 35 further comprising plating a perimeter of the single printed circuit board with conductive material.

41. (AMENDED) A method of isolating subcircuits of a power amplifier comprising:

positioning a plurality of subcircuits, including a gain subcircuit, on a single circuit board;

distributing signals in the subcircuits through multiple conductive signal distribution layers ;

providing a ground plane layer between the multiple conductive signal distribution layers wherein at least one of the signal distribution layers is embedded in the circuit board;

mounting the circuit board in a chassis body;

positioning a lid structure having a wall extending therefrom over the circuit board such that the wall surrounds at least one subcircuit and electrically isolates it from another subcircuit;

forming an isolation ground path along a surface of the circuit board and coupling the wall with at least a portion of the isolation ground path for grounding the wall and the lid structure.

42. The method of claim 41 wherein the chassis body includes a ground surface and further comprising electrically coupling the ground isolation path with the chassis body ground surface.

43. The method of claim 41 wherein the lid structure wall coupled to the ground isolation path has a shape generally corresponding to the ground isolation path.

44. The method of claim 41 further comprising positioning a gasket between the wall and the ground isolation path.

45. (AMENDED) The method of claim 42 [wherein said circuit board has multiple conductive layers separated by a dielectric layer, and] further comprising coupling [a first conductive] the signal distribution layers to components of the subcircuits and coupling the ground plane [another conductive] layer to the chassis body ground surface.

46. The method of claim 46 further comprising forming a plurality of plated vias to extend into the circuit board for forming the isolation ground path.